Building and Appliance Efficiency Office

Blueprint

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California Energy Commission

RESIDENTIAL STANDARDS

Questions and Answers

Q ***The 1992 Energy Efficiency Standards don't specify whether buildings damaged by natural disasters can be reconstructed to their original energy performance specifications. What requirements apply under these circumstances?***

Buildings destroyed or damaged by natural disasters must comply with the energy code requirements in effect when the builder or owner applies for a permit to rebuild. The requirements that apply will depend on whether the scope of work is an addition, alteration or new building.

Q ***How can I determine if the scope of work is an addition, alteration or new building? And what requirements apply?***

Section 100 of the ***Energy Efficiency Standards*** ("Standards") indicates that the standards apply to buildings "for which an application for a building permit or renewal of an existing permit is filed (or required by law to be filed)." It comes down to whether the change is an "addition" or an "alteration."

Changes that require a building permit for an increase in conditioned floor area and conditioned volume are "additions." An addition meets the requirements found in Standards Section 152(a).

Changes that require a building permit but do not add conditioned floor area and conditioned volume are "alterations." An alteration is any change to an existing building's water heating, space conditioning or lighting system, or to the envelope that is not an addition. Alterations must meet any mandatory requirements that apply to the specific component being changed (Standards Section 152(b)).

Rebuilding after a natural disaster (if a permit is required) will likely be either an alteration (Standards Section 152(b)) or a new building (Standards Section 100(d)). Requirements for new buildings apply if the local building official determines that the reconstruction is so extensive it is a new building.

Repairs and maintenance work *that do not require a building permit* are not covered by the Standards.

Q ***If I am simply replacing the windows in a home with new windows of the same size, do I have to meet a specific U-value requirement? When would I have to meet a maximum U-value for an alteration?***

On June 9, 1993, the Energy Commission confirmed an interpretation stating that simply replacing windows with the same size window does not trigger a U-value requirement.

Energy Efficiency Standards Section 152(b) provides that windows replaced or added "as part of an alteration" must meet a 0.75 maximum U-value. In an alteration requiring a building permit, any replaced window within the area being altered must have a maximum U-value of 0.75. Also, the 0.75 maximum U-value applies to any window added where one did not previously exist, or when an existing window opening is

enlarged. This requirement does not apply to any windows in other areas of the house that are being replaced at the same time.

Q ***The compliance calculations for a house in Climate Zone 12 show aluminum dual-pane windows with a 0.65 U-value. At the time of inspection, these windows had labels indicating a 0.87 U-value. Do the energy calculations need to be redone if they want to install these windows?***

If the permit application date was before July 1, 1993, the aluminum dual-pane windows are acceptable regardless of the labeled U-value (as allowed by the exception to Section 116(a)). For any permit applications made after July 1, 1993, the labeled U-value of fenestration products must match or be less than the U-value contained in the energy documentation. **NOTE**: To facilitate field inspection, plan checkers should note the permit application date on the CF-1R (Certificate of Compliance) form.

Q ***What is a CF-6R and why is it required?***

The CF-6R is an installation certificate for manufactured devices regulated by the appliance standards (Part 6 of Title 24, ***Energy Efficiency Standards***). The certification must include a statement indicating that installed devices conform to appliance and building standards and to any additional requirements contained in the plans and specifications. The certificate must be signed by the person with overall responsibility for construction or the person(s) responsible for installing the certified devices and/or appliances. This certificate must be posted adjacent to the building permit.

Prior to January 1, 1993, some of the information required on the CF-6R (e.g., manufacturer, model number, efficiency) was shown on the CF-1R (Certificate of Compliance). This information, however, was not always known at the time of permit application, or different models were substituted when actually installed. The CF-6R will help ensure that installed devices conform to specifications and meet or exceed minimum efficiency requirements.

Q ***What are the plan checking/field inspection requirements related to the CF-6R?***

The CF-6R (Installation Certificate) is not required to be submitted with other compliance documentation at the time of permit application, but rather is posted for field inspection. A field inspector will want to check the equipment installed against what is listed on the CF-6R and compare the CF-6R and CF-1R for consistent equipment characteristics.

California Code of Regulations Section 10-103(a)(3)(B) allows the enforcement agency to request additional information to determine that the building is constructed consistent with approved plans and specifications. When equipment efficiencies above the minimum requirements are shown on the CF-1R (e.g., 12 SEER cooling equipment; 0.63 energy factor water heater), the building department should have procedures in place to verify efficiency. Requiring proof of efficiency from the installer, such as a copy of the appropriate page from the directory of certified equipment, is one possibility. Another possibility is to require that the applicant send a duplicate of the CF-6R through plan check for verification.

Q ***What happens to the CF-6R after the final inspection?***

California Code of Regulations Section 10-103(b) requires that the builder provide to the "building owner, manager, and the *original occupants* the appropriate Certificate(s) of Compliance and a list of the features, materials, components, and mechanical devices installed in the building, and instructions on how to use them efficiently" (italics added). At a minimum, the information on the CF-6R and CF-1R must be provided to the original building occupants.

Question and Answers (continued)

Q ***I received a building permit for a house which complied under the 1988 standards with R-5.79 ducts specified in the energy documentation. Ducts with R-5.79 insulation are no longer available. What should I install?***

You can either install duct insulation meeting or exceeding the R-5.79 required in the calculations (R-6 or R-8 duct insulation is commonly available) or recalculate energy compliance for the building based on R-4.2 insulation (also commonly available). Any installed duct must have a labeled duct R-value consistent with the R-value indicated on the CF-1R. (**NOTE**: After January 1, 1993, a duct previously labeled with an R-value of 5.79 is now likely labeled as R-4.2 due to more accurate and consistent testing and labeling requirements.)

Q ***Is it possible to receive infiltration and duct efficiency credits (i.e., ducts in conditioned space) for a central furnace, specifically where the furnace closet is either within the conditioned space or is in an indirectly conditioned space and the ducts are located inside the furnace closet?***

It is not possible to get infiltration credit ("no ducts in unconditioned space") or duct efficiency credit unless you have either a pulse or condensing furnace with all of the duct work, including plenums, located within conditioned space, or a ductless heating system. Although pulse and condensing furnace technologies duct the combustion supply and exhaust air from the outdoors, typical furnaces require vented outdoor air for combustion. Once a furnace closet is vented to allow for outside combustion air, the supply and return plenums are no longer in conditioned space.

Q ***For an apartment building with raised concrete floors over an unconditioned garage, can the mandatory requirement for R-8 insulation be met by weight averaging the floor assembly?***

No. ***Energy Efficiency Standards*** Section 150(d) requires insulation with an installed thermal resistance of R-8.

Q ***If insulation is installed between floors of an apartment building (sound-proofing), can I install incandescent fixtures that are not IC-rated?***

No. Although this isn't part of the building envelope, the ***Energy Efficiency Standards*** Section 150(k) state that any incandescent fixture recessed into an insulated ceiling must be approved for zero-clearance insulation cover.

Q ***The 1991 Uniform Building Code has a newly defined occupancy category called "congregate residence" that is neither an R-1 nor an R-3. Which standards apply?***

The UBC definition indicates that convents, monasteries and dormitories may be a "congregate residence." Since these building types are typically R-1 occupancies, congregate residences with three or fewer stories should meet the requirements found in the ***Residential Manual***. A congregate residence with four or more stories must meet the requirements found in the ***Nonresidential Manual.***

NONRESIDENTIAL STANDARDS

Questions and Answers

Q ***When calculating the maximum allowable glazing area for prescriptive compliance (40 percent of gross exterior wall area), are demising walls/partitions counted as part of the exterior wall area?***

No. The ***Nonresidential Manual*** (pages 3-3 through 3-4) contains a comprehensive list of surface definitions (from ***Energy Efficiency Standards*** Section 101) which show that demising walls are not exterior walls. "Exterior partitions" separate conditioned space from ambient air or an adjacent space that is not enclosed, and a "demising partition" separates conditioned space from

an adjacent unconditioned enclosed space. Since the gross exterior wall area is the sum of window area, door area and exterior wall area only, and since exterior walls/partitions do not include demising walls/partitions, demising walls are not included in the gross wall area.

Q ***Does the square footage calculation for gross sales area in a retail space exclude areas of floor displays?***

No. The gross sales floor area, as defined in ***Energy Efficiency Standards*** Section 101(b), includes floor space used for the *display* and sale of merchandise.

Q ***When is the wattage for exhaust fans NOT counted, in determining whether total fan energy exceeds 25 horsepower?***

Fans that exhaust only unconditioned air are not counted when calculating fan energy (**Nonresidential Manual**, page 4-33). Some examples are fans in unconditioned mechanical rooms or unconditioned garage exhaust fans.

Q ***I have several questions related to lighting alterations and application of the Energy Efficiency Standards (Section 149):***

When is it necessary to calculate the existing watts per square foot for alteration requirements?

Section 149(b)1.C. specifies that you must meet current standards for lighting power density (Section 146) if the alteration results in an increase in the connected lighting load or involves replacing more than 50 percent of the lighting. It may be necessary to calculate the existing wattage to demonstrate that the alteration does not result in an increased lighting level.

If I need to determine my existing lighting level (to verify that I have not increased the connected load), are there some guidelines I should use, and how is it documented?

To determine existing lighting levels, use the same methodology used for new lighting installations (***Nonresidential Manual***, pages 5-29 through 5-30). For example, track lighting is counted at 45 watts per linear foot of track. Use a form LTG-2 noting that it is the "existing" lighting power.

What is the correct way to determine if 50 percent or more of the fixtures are being replaced? For example, all of the fixtures in the 2,000 square-foot cafeteria of a 20,000 square-foot multi-story office building with one tenant are changing.

The 50 percent or more fixture replacement is based on the *permitted space* (not the *building space)* that is being altered, therefore you must comply with Section 146 because 100 percent of the fixtures in the cafeteria are being replaced.

How do I determine which mandatory requirements apply?

Mandatory measures apply to the lighting *component* being altered (Section 149(b)1.)

Section 111 requires certification of any new lamps and ballasts that are installed if they are the type regulated by the ***Appliance Efficiency Standards.***

Section 119 contains the minimum requirements for any newly installed lighting controls.

Altered lighting systems in high-rise residential living quarters and hotel/motel guest rooms must comply with the requirements of Section 130.

Compliance with Sections 131 and 132 will apply on a case-by-case basis. Independent switching within a space or room (Section 131(a)) is required if ceiling height partitions are installed or moved, creating a new enclosed space. Bi-level illumination (Section 131(b)) is required if the alteration consists of rewiring and the permitted space exceeds 100 square feet and has more than 1.2 watts per square foot. Separate switching for daylit areas (Section 131(c)) is required if the

Questions and Answers (continued)

alteration involves rewiring and the permitted space exceeds 250 square feet.

Shut-off control requirements (Section 131(d)) apply if the permitted space exceeds 5,000 square feet. Tandem wiring (Section 132) is required if the alteration involves rewiring. (**NOTE**: There are exceptions and alternative methods of complying with each of these sections which are not covered in this discussion.)

Are shut-off controls (Section 131(d)) required if the permitted space totals more than 5,000 square feet but the spaces are not contiguous? (Example #1: a department store altering three different departments on two floors; Example #2: multiple spaces in an office complex.)

Yes, some type of shut-off control is required if the permitted space totals 5,000 square feet or more. In Example #1, the building management may choose to equip the entire building with shut-off controls (one per floor). In Example #2, if all of the spaces were permitted together, at least one shut-off per floor affected by the alteration is required. A possible solution is to install an automatic time switch control for each floor and provide a manual override for each individual space. Each override must control a *maximum* area of 5,000 square feet.

If the alteration affects one or more parts of a building, is the lighting system of the rest of the space and/or building included in the documentation or affected in any way?

No. Only the areas affected by the alteration should be included in documentation. Unaltered lighting does not need to meet any requirements of the ***Energy Efficiency Standards***.

DID YOU KNOW . . . ?

Home Energy Magazine—Duct Issue

• • • *Home Energy Magazine* will publish a special issue on residential ducts in its September/October 1993 issue, with support from the California Institute for Energy Efficiency (CIEE). The issue will be comprehensive in scope; featuring articles on the latest developments in the industry written by the nation's leading experts.

This special issue is temporarily available for $2 (for shipping and handling) to *Blueprint* readers (newsstand price $8.50) courtesy of CIEE.

To reserve a copy, request P400-93-004. Be sure to include a self-addressed mailing label and a check or money order for $2.00 payable to the California Energy Commission.

Don't delay. Quantities are limited and will be reserved at this price on a first-come, first served basis. The magazine will be mailed to you in September.

New Publication

• • • The ***Home Energy Manual*** is available. It meets the requirements of ***California Code of Regulations*** Section 10-103(b) and provides new homeowners with helpful information on how to maintain and improve the energy efficiency of their new home. Request P400-92-031, $3.00).

CBCI Education Week

• • • This year's California Building Codes Institution Education Week (November 1-5, 1993, San Jose) is designed to give building department staff, engineers, architects and construction industry members the opportunity to brush up on building code requirements; learn about new state regulations; attend courses to maintain the Council of American Building Officials certification; and prepare for ICBO certification exams. Class topics will include seven different Management subjects, 17 classes on Codes/State Amendments, and 12 new courses added in response to specific requests. For additional information, contact California Building Codes Institute at (916) 456-3824.

TRAINING

Date	Location	Sponsor	Topic
9/13	Sacramento	CBCI	Nonresidential Mechanical

CBCI: California Building Codes Institute presents training designed for building department personnel, but open to all interested persons. Class fees are $125/one-day or $195/two-day sessions (building department personnel should contact CBCI directly regarding class fees). Contact CBCI at (916) 456-3824.

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